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(54) Video recorder power supply

(57) The power supply includes a first voltage regulator 22 for supplying a controller 25; a second voltage regulator 23 for supplying power to portions of the video recorder which operate only in a operation mode of the video recorder 26, 27, 28; and a third voltage regulator 24 for supplying power to portions 29, 30 which perform a program reservation function and a timer function. The controller, in a power on mode, outputs a signal for turning on the second and third voltage regulators. In a power off or standby mode, the controller ascertains whether there is a reserved program or not so that if not, a signal for turning off the second and third voltage regulators is output, but if so, a signal for periodically turning on/off the third voltage regulator portion is output.

Thus the tuner portion may be separately powered during the standby mode, which is particularly relevant to VPS-equipped video recorders.

FIG. 2

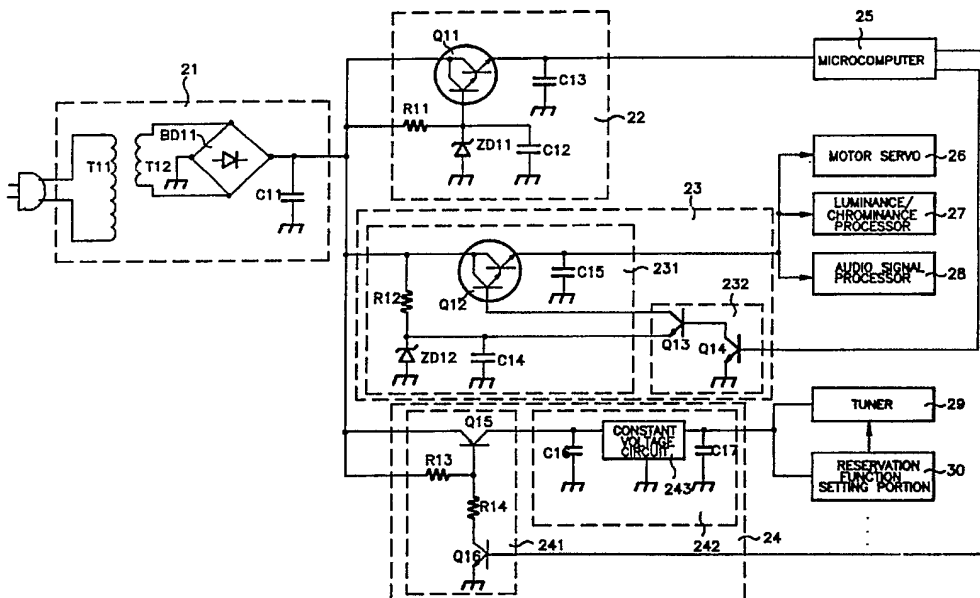


FIG. 1
PRIOR ART

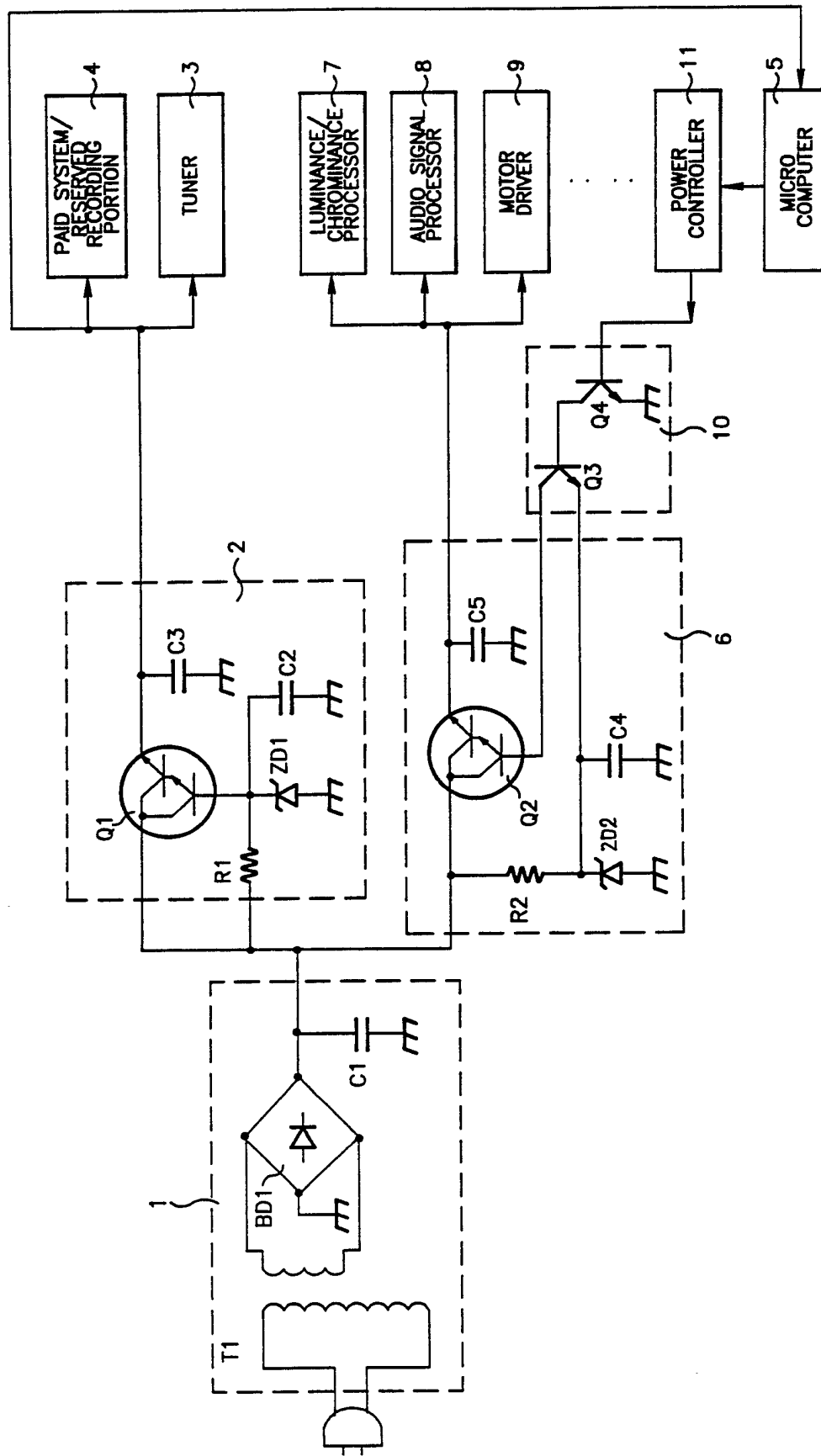
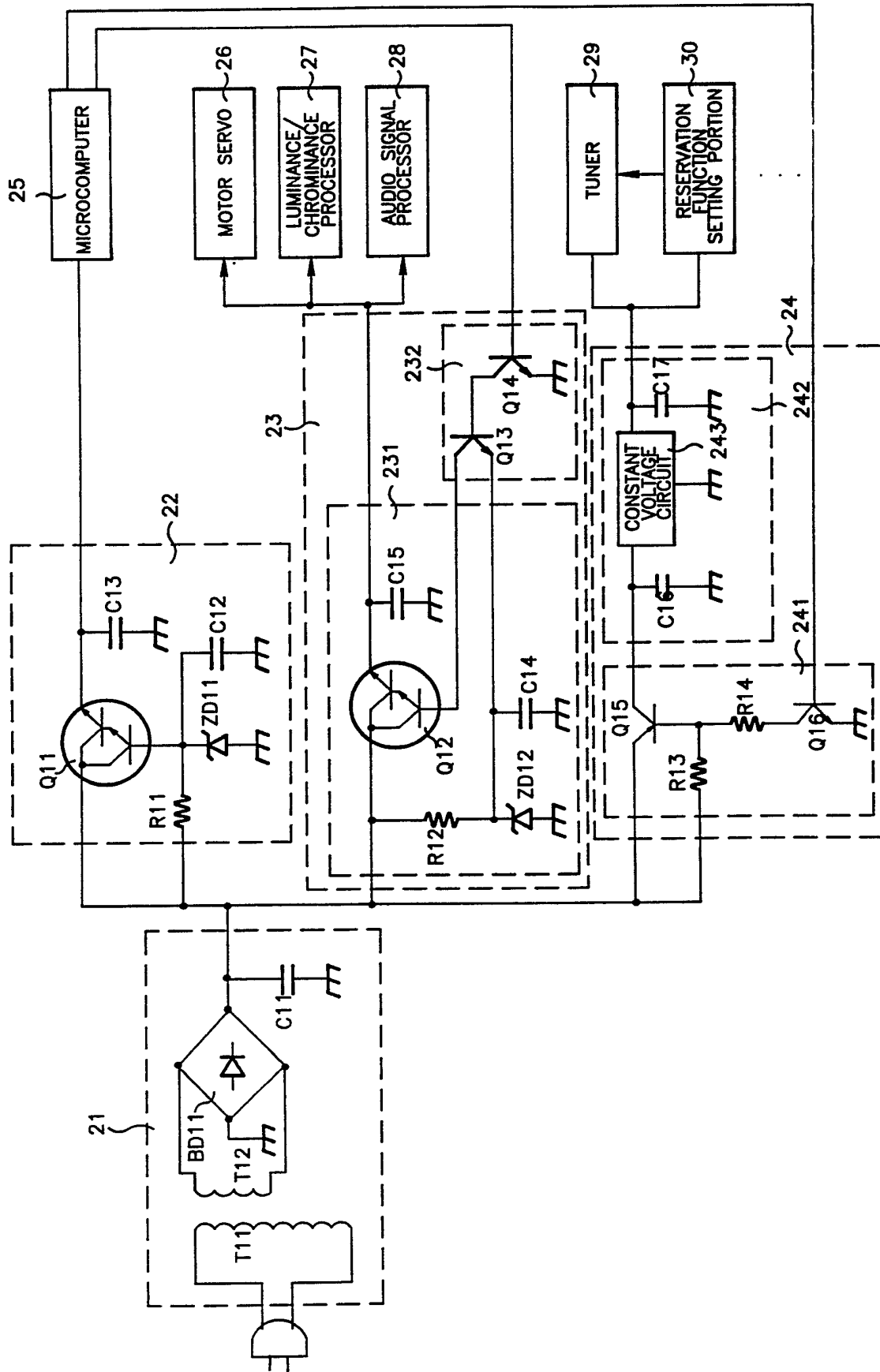


FIG. 2



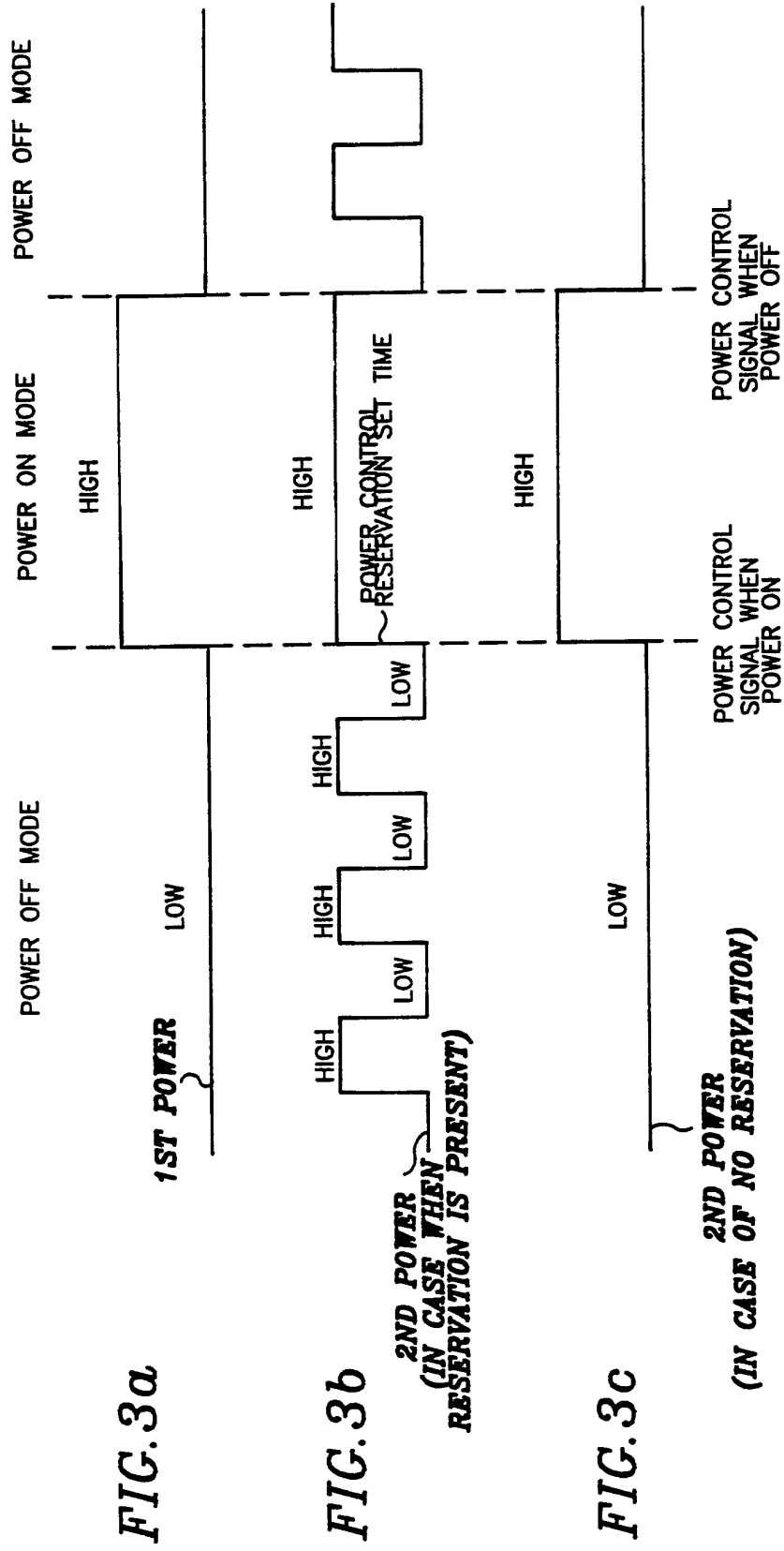
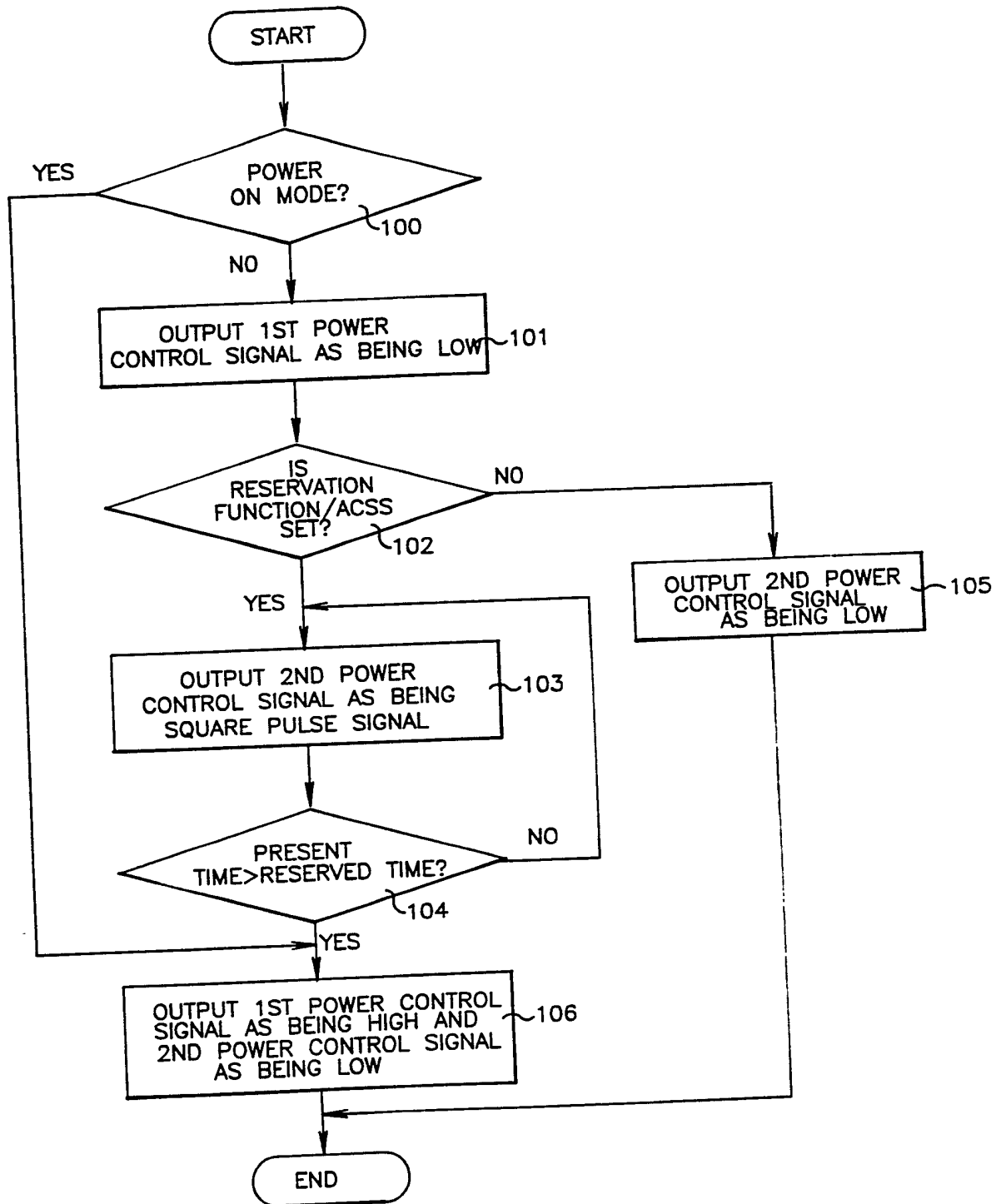


FIG. 4



Background of the Invention

The present invention relates to a power supplying apparatus and controlling method for controlling power to be supplied to a system to thereby reduce power consumption, and more particularly, to a power supplying apparatus and controlling method for, in a power off mode or standby mode in which power is not supplied to an operating portion but only to a portion for control or performing a reserved program, supplying power to a predetermined portion and only at a predetermined time to thereby minimize power loss.

Fig. 1 is a circuit diagram of a conventional power supplying apparatus for a video cassette recorder (VCR).

Referring to Fig. 1, the conventional power supplying apparatus for VCR comprises a power supplier 1 for converting a general voltage (AC100V-240V) input via a power cord into a lower voltage, and rectifying and smoothing the converted voltage so as to supply a direct-current power, a microcomputer 5 for deciding whether a system, for instance, a VCR, operates or not, a constant voltage circuit 2 for controlling the output power of power supplier 1 to a required voltage so as to supply a constant voltage to a tuner 3, a paid system/reserved recording portion 4, and microcomputer 5, a constant voltage circuit 6 for controlling the output power

of power supplier 1 to a required voltage according to the
control of microcomputer 5 so as to supply a voltage to a
luminance/chrominance signal processor 7, an audio signal
processor 8, and a motor driver 9, a power controller 11 for
controlling power supply according to the control of
microcomputer 5, and a switching portion 10 for switching to
control the operation of constant voltage circuit 6 according
to the control of power controller 11.

Power supplier 1 is made up of a transformer T1 in which
both ends of the primary side are connected to the power code,
a bridge diode BD1 whose input port is connected to both ends
of the secondary side of transformer T1, and a capacitor C1 in
which one end and the other end are connected to the output
port of bridge diode BD1 and to the ground, respectively.

Constant voltage circuit 2 comprises a Darlington
transistor Q1 whose collector is connected to one end of
capacitor C1 of power supplier 1, a resistor R1 whose one end
is connected to one end of capacitor C1 of power supplier 1,
and whose other end is connected to the base of Darlington
transistor Q1, a zener diode ZD1 whose cathode is connected to
the base of Darlington transistor Q1, and whose anode is
connected to the ground, a ripple-preventing capacitor C2
connected in parallel with zener diode ZD1, and a bypass
capacitor C3 in which one end and the other end are connected
to the emitter of Darlington transistor Q1 and to the ground,

respectively.

Constant voltage circuit 6 is made up of a resistor R2 in which one end is connected to one end of capacitor C1 of power supplier 1 and the other end is connected to switching portion 10, a zener diode ZD2 whose cathode is connected to the other end of resistor R2, and whose anode is connected to the ground, a capacitor C4 connected in parallel with zener diode ZD2, a Darlington transistor Q2 whose collector is connected to one end of capacitor C1 of power supplier 1, and whose base is connected to switching portion 10, and a capacitor C5 in which one end and the other end are connected to the emitter of Darlington transistor Q2 and to the ground, respectively.

Switching portion 10 comprises an npn transistor Q4 whose base is connected to power controller 11, and a pnp transistor Q3 whose base is connected to the collector of npn transistor Q4, whose emitter is connected to the cathode of zener diode ZD2 of constant voltage circuit 6, and whose collector is connected to the base of Darlington transistor Q2.

The operation of the conventional power supplying apparatus employed in a VCR will be explained below.

With general voltage (AC100V-240V) input via the power code, the output voltage is determined by the turn ratio of the primary-side coil and the secondary-side coil of transformer T1 of power supplier 1. The output voltage is full-wave rectified by bridge diode BD1 and smoothed by

capacitor C1, so as to be converted in to a direct-current voltage. This direct-current voltage is output to constant voltage circuits 2 and 6.

5 The direct-current voltage output from power supplier 1 is converted into a constant voltage controlled via constant voltage circuits 2 and 6.

10 In constant voltage circuit 2, a current is supplied to zener diode ZD1 and to the base of Darlington transistor Q1 by bias resistor R1, and the output direct-current voltage is determined by the zener voltage of zener diode ZD1. The emitter voltage of Darlington transistor Q1 is output after being dropped by $0.7V_{BE}$ voltage from the zener voltage of zener diode ZD1.

15 In constant voltage circuit 6, Darlington transistor Q2, resistor R2, zener diode ZD2, and capacitors C4 and C5 operate in the same manner as those of constant voltage circuit 2. The base of Darlington transistor Q2 is turned on or off by transistors Q3 and Q4 of switching portion 10.

20 Specifically, in constant voltage circuit 6, a current is supplied to zener diode ZD2 and to the base of Darlington transistor Q2 by bias resistor R2, and the output direct-current voltage is determined by the zener voltage of zener diode ZD2. The emitter voltage of Darlington transistor Q2 is output after being dropped by $0.7V_{BE}$ voltage from the zener voltage of zener diode ZD2. Here, Darlington transistor Q2

25

operates according to the control of switching portion 10.

In other words, when a power control signal output from power controller 11 controlled by microcomputer 5 is HIGH, npn transistor Q4 of switching portion 10 is turned on so that the base of pnp transistor Q3 becomes LOW. For this reason, the voltage applied to the emitter of pnp transistor Q3 is conducted to the collector and the voltage of zener diode ZD2 is output to the emitter of Darlington transistor Q2 so that constant voltage circuit 6 supplies direct-current power to luminance/chrominance signal processor 7, audio signal processor 8, and motor driver 9. When the power control signal output from power controller 11 controlled by microcomputer 5 is LOW, npn transistor Q4 of switching portion 10 is turned off so that the base of pnp transistor Q3 becomes HIGH. Therefore, the voltage applied to the emitter is not conducted to the collector so that constant voltage circuit 6 does not supply direct-current power.

In this conventional power supplying apparatus, in the power off mode or stand-by mode in which power is not supplied to the operating portion but only to the portions for control or performing a reserved program, the supply of constant voltage is interrupted to luminance/chrominance signal processor 7, audio signal processor 8, and motor driver 9 according to the control of microcomputer 5. Here, the stand-by mode, which usually means the power off mode, is a mode to

wait for reserved recording, reserved operation or reserved turning-on.

However, with the conventional power supplying apparatus, in a VCR having functions such as the video program system (VPS) reserved recording and the auto clock setting system (ACSS) which track a broadcast signal, if there is set a reservation function, direct-current power must be always supplied to tuner 3 and reserved recording portion 4 because the broadcast signal must be tracked in order to perform the reservation function even in the power off mode or stand-by mode. Accordingly, the power off mode or stand-by mode cannot be selected and the power on mode must be maintained in order to perform the above functions. This wastes the power of the VCR set, increasing a consumer's burden and energy dissipation. This also affects the life of products.

Summary of the Invention

Therefore, it is desirable to _____ provide a power supplying apparatus and control method for reducing power in a power off mode or stand-by mode and thereby lengthening the life of system.

According to a first aspect of the present invention, there is provided a power supplying apparatus comprising a power supplying portion for supplying a direct current of a predetermined voltage; a first constant voltage circuit portion for controlling the direct-current voltage output from

the power supplying portion and supplying a desired constant voltage to a controller; a second constant voltage circuit portion for controlling the direct-current voltage output from the power supplying portion and supplying power to a portion which operates only in an operation mode; and a third constant voltage circuit portion for controlling the direct-current voltage output from the power supplying portion and supplying power to a portion which performs a reservation function and a timer function, the controller, in a power on mode, outputting a signal for turning on the second and third constant voltage circuit portions, and in a power off mode, ascertaining whether there is a reserved program or not so that if not, a signal for turning off the second and third constant voltage circuit portions is output, and if so, a signal for periodically turning on/off the third constant voltage circuit portion is output.

Further, there is provided a method of controlling a power supplying apparatus comprising the steps of: deciding whether the present mode is a power on mode which supplies power to a system or a power off mode which does not supply power to the system; if in the power off mode, outputting a first power control signal as being LOW so as to interrupt the supply of constant voltage to the system; detecting whether the reservation function is set or not so that if so, a second power control signal for

supplying the constant voltage by a predetermined period is output until a reservation set time; after the periodic power supplying step, if a reservation set time arrives, or if there is the power on mode after the detection of the power on/off mode, outputting the first and second power control signals as being HIGH so as to perform the power supplying step for supplying the constant voltage to the whole system.

Brief Description of the Drawings

Fig. 1 is a circuit diagram of a conventional power supplying apparatus;

Fig. 2 is a circuit diagram of a power supplying apparatus in accordance with one embodiment of the present invention;

Figs. 3A, 3B and 3C are operation waveforms present at the respective portions of Fig. 2; and

Fig. 4 is a flowchart of explaining a power supplying apparatus controlling method.

Detailed Description of the Invention

The power supplying apparatus — shown in Fig. 2, comprises a power supplier 21, a first constant voltage circuit 22, a power mode constant voltage supplier (or second constant voltage circuit) 23, a stand-by mode constant voltage supplier (or third constant voltage circuit) 24, and a microcomputer (or controller) 25.

Specifically, power supplier 21 of Fig. 2 includes a transformer T11 for converting a general power into a lower voltage, a bridge diode BD11 for full-wave rectifying the voltage output from transformer T11, and a capacitor C11 for smoothing the voltage output from bridge diode BD11 and supplying the voltage to first constant voltage circuit 22, power mode constant voltage supplier 23, and stand-by constant voltage supplier 24. The power supplier converts, rectifies, and smooths the general voltage into a direct-current voltage.

First constant voltage circuit 22 comprises a bias resistor R11 whose one end is connected to one end of capacitor C11, that is, the output port of power supplier 21, a Darlington transistor Q11 whose collector is connected to the output port of power supplier 21, and whose base is connected to the other end of resistor R11, a zener diode ZD11 whose cathode is connected to the base of Darlington transistor Q11, and whose anode is connected to the ground, a ripple-preventing capacitor C12 connected in parallel with zener diode ZD11, and a bypass capacitor C13 in which one end and the other end are connected to the emitter of Darlington transistor Q11 and to the ground, respectively. The first constant voltage circuit controls the direct-current voltage output from power supplier 21, and supplies a constant voltage to microcomputer 25.

Microcomputer 25 receives the constant voltage from first

constant voltage circuit 22, and outputs first and second power control signals for controlling power supply according to a power on mode for supplying power to the system, or according to a stand-by mode for not supplying power to a play portion but only to a portion for control or performing a reserved program.

Power mode constant voltage supplier 23 comprises a switching portion 232 switched according to the first power control signal output from microcomputer 25, and a constant voltage circuit 231 for controlling the direct-current voltage output from power supplier 21 according to the switching operation of switching portion 232 and supplying a constant voltage to the system. The power mode constant voltage supplier controls the direct-current voltage output from power supplier 21 in the power on/off mode according to the first power control signal output from microcomputer 25, so as to supply the constant voltage to the system.

Switching portion 232 comprises an npn transistor Q14 which receives the first power control signal output from microcomputer 25 through the base, and whose emitter is connected to the ground, and a pnp transistor Q13 whose base is connected to the collector of npn transistor Q14, and whose collector and emitter are connected to constant voltage circuit 231.

Constant voltage circuit 231 is made up of a bias

resistor R12 in which one end is connected to the output port of power supplier 21 and the other end is connected to the emitter of pnp transistor Q13, a zener diode ZD12 whose cathode is connected to the other end of resistor R12, and whose anode is connected to the ground, a ripple-preventing capacitor C14 connected in parallel with zener diode ZD12, a Darlington transistor Q12 whose collector is connected to the output port of power supplier 21, and whose base is connected to the collector of pnp transistor Q13, and a bypass capacitor C15 in which one end and the other end are connected to the emitter of Darlington transistor Q12 and to the ground, respectively.

Stand-by mode constant voltage supplier 24 comprises a switching portion 241 switched according to the second power control signal output from microcomputer 25, and a constant voltage circuit 242 for controlling the direct-current voltage output from power supplier 21 according to the switching operation of switching portion 241, and supplying a constant voltage to the system by predetermined intervals. The stand-by mode constant voltage supplier controls the direct-current voltage output from power supplier 21 in the stand-by mode according to the second power control signal output from microcomputer 25, and supplies the constant voltage to the system by predetermined intervals.

Switching portion 241 comprises a resistor R13 in which

one end is connected to the output port of power supplier 21, a pnp transistor Q15 whose base is connected to the other end of resistor R13, whose emitter is connected to the output port of power supplier 21, a resistor R14 in which one end is connected to the other end of resistor R13, and an npn transistor Q16 whose collector is connected to the other end of resistor R14, whose emitter is connected to the ground, and which receives the second power control signal output from microcomputer 25 through the base.

Constant voltage circuit 242 comprises a capacitor C16 in which one end is connected to the collector of pnp transistor Q15 and the other end is connected to the ground, a constant voltage circuit 243 in which the input port is connected to one end of capacitor C16 and which controls the direct-current voltage to supply a constant voltage, and a capacitor C17 in which one end is connected to the output port of constant voltage circuit 243 and the other end is connected to the ground.

Here, the first power control signal stays HIGH in the power on mode for supplying power to the system, and stays LOW in the power off mode in which the power is not supplied to the system. The second power control signal is a square pulse signal in which the HIGH and LOW states are periodically changed in the stand-by mode for supplying power only, while the system does not operate. The second power control signal

stays HIGH in the power on mode for supplying power to the system.

The operation of the power supplying apparatus will be described below with reference to Fig. 3.

5 With a general voltage (AC100V-240V) input via the power code, the output voltage is determined by the turn ratio of the primary-side coil and the secondary-side coil of transformer T11 of power supplier 21. The output voltage is full-wave rectified by bridge diode BD11 and smoothed by
10 capacitor C11 so as to be converted into a direct current. This direct current is output to first constant voltage circuit 22, power mode constant voltage supplier 23, and constant voltage circuits 231 and 242 of stand-by mode constant voltage supplier 24.

15 The direct-current voltage output from power supplier 21 is converted into a constant voltage controlled via constant voltage circuits 22, 231 and 242.

 In first constant voltage circuit 22, a current is supplied to zener diode ZD11 and the base of Darlington
20 transistor Q11 by bias resistor R11. The output direct-current voltage is determined by the zener voltage of zener diode ZD11. The emitter voltage of Darlington transistor Q1 is output after being dropped by $0.7V \times 2$ voltage from the zener voltage of zener diode ZD1.

25 In constant voltage circuit 231, Darlington transistor

Q12, resistor R12, zener diode ZD12, and capacitors C14 and C15 operate in the same manner as those of first constant voltage circuit 22. The base of Darlington transistor Q12 is turned on/off by pnp transistor Q13 and npn transistor Q14 of switching portion 232.

More specifically, in constant voltage circuit 231, a current is supplied to zener diode ZD12 and the base of Darlington transistor Q12 by bias resistor R12. The output direct-current voltage is determined by the zener voltage of zener diode ZD12. The emitter voltage of Darlington transistor Q12 is output after being dropped by $0.7V_{X2}$ voltage from the zener voltage of zener diode ZD12. Here, Darlington transistor Q12 operates according to the control of switching portion 232.

Here, microcomputer 25 decides whether there is a power on mode or power off mode according to the turning on/off states of power, and outputs the first power control signal to switching portion 232. This controls the operation of constant voltage circuit 231 and the constant voltage to be supplied to the system.

In other words, as shown in Fig. 3A, in the power off mode in which the power is not supplied to the system, the first power control signal output from microcomputer 25 becomes LOW so that npn transistor Q14 of switching portion 232 is turned off and the base of pnp transistor Q13 becomes

HIGH. Therefore, pnp transistor Q13 is turned off and the voltage applied to the emitter is not conducted to the collector so that first constant voltage circuit 231 does not supply a direct-current power.

5 As shown in Fig. 3A, in the power on mode in which the power is supplied to the system, the first power control signal output from microcomputer 25 becomes HIGH so that npn transistor Q14 of switching portion 232 is turned on. This renders the base of pnp transistor Q13 LOW. Accordingly, the
10 voltage applied to the emitter of pnp transistor Q13 is conducted to the collector, and the voltage of zener diode ZD12 is output to the emitter of Darlington transistor Q12 so that constant voltage circuit 231 supplies the direct-current power to motor servo portion 26, luminance/chrominance
15 processor 27, and audio signal processor 28.

 In microcomputer 25, as shown in Fig. 3B, in the power off mode in which the power is not supplied to the system, the first power control signal is output as being LOW so as to decide whether there is set a reservation function or not. If
20 so, the second power control signal is output as a square pulse signal which periodically repeats the HIGH and LOW states so as to supply the constant voltage periodically and therefore operate the set reservation function.

 For instance, in a VCR performing a corresponding
25 function such as reserved recording or ACSS function, in the

case when information on respective programs are loaded on a broadcast signal, or a signal for clock setting is loaded thereon, the second power control signal is output so as to receive a broadcast signal of a set broadcasting station at a set time according to the reservation function so that the broadcast signal is received periodically and a constant voltage is supplied to a portion for performing a reading out function.

In microcomputer 25, if the reservation function is set, as shown Fig. 3B, the second power control signal is output as a square pulse signal which is varied periodically into HIGH and LOW states to operate stand-by constant voltage supplier 24.

As shown in Fig. 3B, the second power control signal becomes HIGH so that pnp transistor Q15 and npn transistor Q16 of switching portion 241 are turned on. This allows the direct-current power output from power supplier 21 to be supplied to constant voltage circuit 242 and the constant voltage output from constant voltage circuit 242 to be supplied to tuner 29 and reservation function setting portion 30.

If the second power control signal becomes LOW, pnp transistor Q15 and npn transistor Q16 of switching portion 241 are turned off so that the direct-current power output from power supplier 21 is not supplied to constant voltage circuit

242 and the constant voltage is not supplied to tuner 29 and reservation function setting portion 30.

In the stand-by mode, if the reservation function is set, microcomputer 25 periodically supplies the constant voltage to corresponding blocks, in the case of VCR, for instance, only to tuner 29 and reservation setting portion 30. This enables the reservation function to be performed.

If the reservation function is not set in the power off mode, microcomputer 25 outputs the second power control signal as being LOW, as shown in Fig. 3C, so that the constant voltage is not output from constant voltage circuit 242. If in the power on mode, the first and second power control signals are both output as being HIGH.

Accordingly, the described power supplying apparatus forms three constant voltage circuits so that the constant voltage is always supplied to microcomputer 25. Microcomputer 25 controls so that the constant voltage is supplied not in the power off mode but in the power on mode, to motor servo portion 26, luminance/chrominance signal processor 27, and audio signal processor 28. Further, microcomputer 25 controls so that it is decided whether the reservation function is set in the power off mode. If so, the square pulse signal of a predetermined period is output so as to supply the constant voltage by predetermined periods to tuner 29 and reservation setting portion 30. If not, the

constant voltage is not supplied to tuner 29 and reservation setting portion 30.

A power supplying apparatus controlling method _____
_____ will be described with reference to Fig. 4.

5 First, in step 100, it is decided whether the present mode is the power on mode which supplies power to the system or power off mode which does not supply power to the system.

If in the power off mode in step 100, the first power control signal is output as being LOW in step 101, so as to
10 interrupt the supply of constant voltage to the system.

After step 101, it is detected whether the reservation function is set or not so that if so, the second power control signal for supplying the constant voltage by a predetermined period is output so as to receive a reservation-related
15 broadcast signal for performing the reservation function until a reservation set time.

Specifically, after the power supplying step, it is detected whether the reservation function is set or not in step 102. If not, the second power control signal is output as
20 being LOW and ends in step 105. If so, it is decided whether the present time is the reservation time or not, and repeats the operation of outputting the second power control signal as the square pulse signal until the reservation time.

By doing so, the constant voltage is supplied only to the
25 blocks for performing the reservation function.

After the periodic power supplying step, if the reservation set time arrives, or if there is the power on mode after the detection of the power on/off mode, the first and second power control signals are output as being HIGH so as to perform the power supplying step for supplying the constant voltage to the whole system.

In the state in which the reservation function is set, the second power control signal is a square pulse signal in which HIGH and LOW states are periodically varied.

The described embodiment of the present invention does not always supply power but by a predetermined period, if the reservation function is set, to predetermined system blocks in the power off mode or stand-by mode. As compared with the conventional case when the power is always supplied to the system blocks, power consumption is sharply reduced, resulting in longer life of products. The invention can be employed to various electric or electronic appliances for receiving a broadcast signal, as well as to VCRs and TVs.

CLAIMS

1. A power supplying apparatus comprising:

a power supplying portion for supplying a direct current of a predetermined voltage;

5 a first constant voltage circuit portion for controlling the direct-current voltage output from said power supplying portion and supplying a desired constant voltage to a controller;

10 a second constant voltage circuit portion for controlling the direct-current voltage output from said power supplying portion and supplying power to a portion which operates only in an operation mode; and

15 a third constant voltage circuit portion for controlling the direct-current voltage output from said power supplying portion and supplying power to a portion which performs a reservation function and a timer function,

20 said controller, in a power on mode, outputting a signal for turning on said second and third constant voltage circuit portions, and in a power off mode, ascertaining whether there is a reserved program or not so that if not, a signal for turning off said second and third constant voltage circuit portions is output, and if so, a signal for periodically turning on/off said third constant voltage circuit portion is output.

25 2. A power supplying apparatus as claimed in claim 1,

wherein said power supplying portion comprises:

a transformer for converting a general power into a lower voltage;

a bridge diode for full-wave rectifying the voltage output from said transformer; and

a capacitor for smoothing the voltage output from said bridge diode and supplying the smoothed voltage to said first constant voltage circuit portion, second constant voltage circuit portion, and third constant voltage circuit portion.

3. A power supplying apparatus as claimed in claim 1 or claim 2, wherein said first constant voltage circuit comprises:

a bias resistor whose one end is connected to the output port of said power supplier;

a Darlington transistor whose collector is connected to the output port of said power supplier, and whose base is connected to the other end of said resistor;

a zener diode whose cathode is connected to the base of said Darlington transistor, and whose anode is connected to the ground;

a ripple-preventing capacitor connected in parallel with said zener diode; and

a bypass capacitor in which one end and the other end are connected to the emitter of said Darlington transistor and to the ground, respectively.

4. A power supplying apparatus as claimed in any preceding claim,

wherein said second constant voltage circuit portion
comprises:

a switching portion switched by said controller; and

a constant voltage circuit for controlling the direct-
current voltage output from said power supplying portion
according to the switching operation of said switching portion
and supplying a constant voltage to a system.

5. A power supplying apparatus as claimed in claim 4,
wherein said switching portion comprises:

a first transistor which receives said first power
control signal output from said controller through the base;
and

a second transistor whose base is connected to the
collector of said first transistor, and whose collector and
emitter are connected to said constant voltage circuit.

6. A power supplying apparatus as claimed in claim 5,
wherein said constant voltage circuit comprises:

a bias resistor in which one end is connected to the
output port of said power supplying portion and the other end
is connected to the emitter of said second transistor;

a zener diode whose cathode is connected to the other end
of said resistor, and whose anode is connected to the ground;

a ripple-preventing capacitor connected in parallel with
said zener diode;

a Darlington transistor whose collector is connected to

the output port of said power supplying portion, and whose base is connected to the collector of said second transistor; and

5 a bypass capacitor in which one end and the other end are connected to the emitter of said Darlington transistor and to the ground, respectively.

7. A power supplying apparatus as claimed in any preceding claim, wherein said third constant voltage circuit portion comprises:

10 a switching portion switched according to said second power control signal output from said controller; and

15 a constant voltage circuit for controlling the direct-current voltage output from said power supplying portion according to the switching operation of said switching portion, and supplying a constant voltage to the system by predetermined intervals.

8. A power supplying apparatus as claimed in claim 7, wherein said switching portion comprises:

a first resistor in which one end is connected to the output port of said power supplying portion;

20 a first transistor whose base is connected to the other end of said first resistor, whose emitter is connected to the output port of said power supplying portion;

a second resistor in which one end is connected to the other end of said first resistor; and

25 a second transistor whose collector is connected to the

other end of said second resistor, whose emitter is connected to the ground, and which receives said second power control signal output from said controller through the base.

9. A method of controlling a power supplying apparatus comprising the steps of:

deciding whether the present mode is a power on mode which supplies power to a system or a power off mode which does not supply power to the system;

if in the power off mode, outputting a first power control signal as being LOW so as to interrupt the supply of constant voltage to the system;

detecting whether the reservation function is set or not so that if so, a second power control signal for supplying the constant voltage by a predetermined period is output until a reservation set time;

after the periodic power supplying step, if a reservation set time arrives, or if there is the power on mode after the detection of the power on/off mode, outputting the first and second power control signals as being HIGH so as to perform the power supplying step for supplying the constant voltage to the whole system.

10. A method of controlling a power supplying apparatus as claimed in claim 9, wherein in the state in which the reservation function is set, the second power control signal is a square pulse signal in which HIGH and LOW states are

periodically varied.

11. A power supplying apparatus substantially as herein described with reference to Figures 2 to 4 of the accompanying drawings.

12. A method of controlling a power supplying apparatus substantially as herein described with reference to Figures 2 to 4 of the accompanying drawings.

Patents Act 1977
Examiner's report to the Comptroller under Section 17
(The Search report)

Application number
GB 9501982.4

Relevant Technical Fields

- (i) UK Cl (Ed.N) G4R (RGC, RQA), H3Q (QRPS), H4T (TADD)
- (ii) Int Cl (Ed.6) G11B 15/00, 15/02, 33/00, 33/02, 33/12; H04N 5/63

Search Examiner
MR P J EASTERFIELD

Date of completion of Search
6 APRIL 1995

Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

Documents considered relevant following a search in respect of Claims :-
1 to 10

(ii) ONLINE DATABASES: WPI, JAPIO, CLAIMS

Categories of documents

- X:** Document indicating lack of novelty or of inventive step. **P:** Document published on or after the declared priority date but before the filing date of the present application.
- Y:** Document indicating lack of inventive step if combined with one or more other documents of the same category. **E:** Patent document published on or after, but with priority date earlier than, the filing date of the present application.
- A:** Document indicating technological background and/or state of the art. **&:** Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
	NONE	

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